

A Review on Major Reproductive Diseases and Disorders of Cattle, and Their Ecological Distributions Kept Under Different Management Options

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ABSTRACT

Reproductive diseases and disorders of dairy cattle are global challenges and threats of fertility and reproductive efficiency particularly in developing countries such as Ethiopia. The objective of this review is to summarize and disseminate the fragmented information on major reproductive diseases and disorders of cattle, and their ecological distributions kept under different management options. Although Ethiopia is a home for huge number of cattle, cattle productivity is low due to constraints such as diseases, poor nutrition and poor management. Reproductive diseases and disorders are the major reasons for decreased reproductive efficiency in cattle. Brucellosis is an infectious reproductive and zoonotic disease, and causes heavy economic losses and public health concern throughout the world. The major reproductive diseases and disorders of cattle that have direct impact on reproductive performance and efficiency of dairy cows comprise retained fetal membrane (RFM), repeat breeding, abortion, anestrus, dystocia, vaginal and uterine prolapses, brucellosis and metritis. Prevention of losses due to reproductive disorders is in the prevention of reproductive disorders, not in their treatment. Reproductive diseases and disorders result in culling of animals and disturb cattle herds. Breed, body condition, animal age, parity number and management system are major risk factors for reproductive diseases and disorders. An in-depth study of the reproductive diseases and disorders should be carried out across the different agro-ecologies, seasons of the year and specific cattle genotypes.

Keywords: Ecological distributions; Management options; Reproductive diseases; Dairy cattle; Reproductive disorders; Abortion; Altitude; Repeat breeding; Retained fetal membrane; Anestrus; Dystocia.

1. Introduction

Ethiopia has large potential for livestock production in Sub-Saharan Africa. It is first among African countries and 9th in the world [1]. To maintain fertility and high milk yield in cows, cows must be kept healthy [2]. Prevention of losses due to reproductive disorders is in the prevention of reproductive disorders, not in their treatment [3]. Frequent occurrence of reproductive problems in dairy cows can dramatically affect reproductive efficiency in a dairy herd [4]. Production and productivity of dairy cows are affected by the most important problems called reproductive disorders [5]. Although Ethiopia is a home for huge number of cattle, cattle productivity is low due to constraints such as disease, poor nutrition and poor management. These constraints result in poor reproductive performance of dairy cattle and lower economic benefit [6,7]. Brucellosis is among the infectious reproductive diseases, and is a common genital disease which induces abortion in animals and humans, continues to cause heavy economic losses and public health concern throughout the world [8]. It is transmitted to people by direct or indirect contact with infected animals or their products [9].

Embryonic death, fetal death (mummification, fetal maceration, abortion and stillbirth), dystocia, retained fetal membrane (RFM), metritis and repeat breeder are syndromes in the reproductive process that affect the pregnancy and gestation, and lead to loss of calf production [10]. Abortion, metritis, RFM, dystocia, anoestrus, repeat breeder, and uterine and vaginal prolapses are reproductive disorders all reported from different parts of Ethiopia which affected the reproductive performance of the dairy cows [11]. Cow, she buffalo, ewe and doe are ruminants which most commonly exhibit genital prolapses [12]. Uterine and vaginal prolapses are frequently observed in cows [13]. Body condition and parity were the possible risk factors for the occurrence of reproductive health problems in dairy

farms of Urban and Per urban areas of Hosanna of SNNP region, Ethiopia [14]. About a third of all Dairy herds and cows in Europe and America are culled because of reproductive disturbances [15].

A questionnaire survey and regular follow up on crossbred dairy cattle indicated that reproductive problems were more prevalent in large scale farms [16]. [17] reported that HF cross (43.39%) showed a higher incidence of reproductive disorders than Jersey crosses (28.29%). Moreover, [18] reported that reproductive health problems were observed more frequently in HF breed than Borena breed, and poor body conditioned cows. Cattle are the most suffering animals among the livestock species. Five to eight years old cattle suffer more than that of their young counterparts [19]. A review work of [11] of different districts and production years indicated that the prevalence of anestrus in dairy cattle in Ethiopia ranged from 0.3-38.6%. The authors also reviewed and reported that the prevalence of repeat breeding and dystocia in dairy cattle in Ethiopia ranged from 1.3-28% and 0.79-11.6%, respectively. The prevalence of abortion, RFM and uterine prolapse in dairy cows in Ethiopia of different districts and production years ranged 0.63-16.3%, 3.36-26.6% and 0.5-2.9%, respectively [11].

Therefore, the objective of this review is to summarize and disseminate the fragmented information on major reproductive diseases and disorders of cattle, and their ecological distributions kept under different management options. Prevalence of major cattle reproductive diseases and disorders kept under different management options are described in table (1) below.

2. Materials and Methods

Almost all of the zonation system (zone nomenclature) of each study area of the reviewed materials is provided based on [20] traditional zonation system. The zone nomenclature (*italicized* and **bold**) was based on the written altitudes of the study areas of the research activities conducted (reviewed materials). Ecological distributions of major cattle reproductive diseases and disorders are described in table (2) below.

3. Review Results

Table 1. Prevalence of major cattle reproductive diseases and disorders kept under different management options

Reproductive diseases and problems	Management system	Cattle breed/type	Prevalence (%)	Author(s)	Remark
Repeat breeding	65.64% intensive	89.4% Cbc	13.08	[14]	Hosanna, SNNP, Ethiopia
Anestrous	65.64% intensive	89.4% Cbc	10.26	[14]	Hosanna, SNNP, Ethiopia
Retained placenta (RFM)	65.64% intensive	89.4% Cbc	7.18	[14]	Hosanna, SNNP, Ethiopia
Anestrous	Intensive system	HFxZ	37.8	[21]	In and around Mekelle, Ethiopia

Repeat breeding	Intensive system	HFxZ	21.0	[21]	In and around Mekelle, Ethiopia
Dystocia	Intensive system	HFxZ	11.6	[21]	In and around Mekelle, Ethiopia
RFM	Semi-intensive	Horro (H), HFxH and JersyxH	8.3	[22]	Bako Research Center, Ethiopia
Dystocia	Semi-intensive	Horro (H), HFxH and JersyxH	6.7	[22]	Bako Research Center, Ethiopia
Abortion	Semi-intensive	Horro (H), HFxH and JersyxH	5.9	[22]	Bako Research Center, Ethiopia
Stillbirths	Semi-intensive	Horro (H), HFxH and JersyxH	4.8	[22]	Bako Research Center, Ethiopia
RFM	Semi-intensive	Dairy cattle	51.0	[23]	Nekemte town, East Wollega Zone, Ethiopia
Abortion	Semi-intensive	Dairy cattle	25.5	[23]	Nekemte town, East Wollega Zone, Ethiopia
Dystocia	Semi-intensive	Dairy cattle	19.6	[23]	Nekemte town, East Wollega Zone, Ethiopia
Anestrus	Semi-intensive system	HFxIndian local cattle, JerseyxIndian local cattle	31.79	[17]	Meghalaya province of North-Eastern India
Repeat breeding	Semi-intensive system	HFxIndian local cattle, JerseyxIndian local cattle	24.61	[17]	Meghalaya province of North-Eastern India

RFM	Semi-intensive system	HFxIndian local cattle, JerseyxIndian local cattle	14.35	[17]	Meghalaya province of North-Eastern India
Abortion	Semi-intensive system	HFxIndian local cattle, JerseyxIndian local cattle	11.25	[17]	Meghalaya province of North-Eastern India
Anoestrus	Unknown	Unspecified	22.35	[19]	Saturia Government Veterinary Hospital, Manikgon, Bangladesh
RFM	Unknown	Unspecified	20.39	[19]	Saturia Government Veterinary Hospital, Manikgon, Bangladesh
Repeat breeding	Unknown	Unspecified	19.27	[19]	Saturia Government Veterinary Hospital, Manikgon, Bangladesh
Dystocia	Unknown	Unspecified	13.69	[19]	Saturia Government Veterinary Hospital, Manikgon, Bangladesh
Utero-vaginal prolapse	Unknown	Unspecified	13.40	[19]	Saturia Government Veterinary

					Hospital, Manikgon, Bangladesh
Pyometra	Unknown	Unspecified	8.66	[19]	Saturia Government Veterinary Hospital, Manikgon, Bangladesh
Prolonged anoestrus	Semi- intensive system	Jersey	48.5	[24]	Adea berga dairy farm, West Shewa Zone, Oromia region, Ethiopia
Abortion	Semi- intensive system	Jersey	28.9	[24]	Adea berga dairy farm, West Shewa Zone, Oromia region, Ethiopia
Still birth	Semi- intensive system	Jersey	14.4	[24]	Adea berga dairy farm, West Shewa Zone, Oromia region, Ethiopia
RFM	Semi- intensive system	Jersey	5.2	[24]	Adea berga dairy farm, West Shewa Zone, Oromia region, Ethiopia
Repeat breeder	Intensive system	Borena and HF breeds	18.6a	[18]	Alagae dairy farm, Southern Ethiopia
RFM	Intensive system	Borena and HF breeds	6.98a	[18]	Alagae dairy farm, Southern Ethiopia
Abortion	Intensive system	Borena and HF breeds	5.81a	[18]	Alagae dairy farm, Southern Ethiopia
Dystocia	Intensive system	Borena and HF breeds	4.65a	[18]	Alagae dairy farm, Southern Ethiopia

Anoestrus	Intensive system	Borena and HF breeds	4.65a	[18]	Alagae dairy farm, Southern Ethiopia
Repeat breeder	Intensive system	Borena and HF breeds	16.18b	[18]	Alagae dairy farm, Southern Ethiopia
Metritis	Intensive system	Borena and HF breeds	6.36b	[18]	Alagae dairy farm, Southern Ethiopia
RFM	Intensive system	Borena and HF breeds	5.78b	[18]	Alagae dairy farm, Southern Ethiopia
Abortion	Intensive system	Borena and HF breeds	4.05b	[18]	Alagae dairy farm, Southern Ethiopia
Anoestrus	Intensive system	Borena and HF breeds	3.47b	[18]	Alagae dairy farm, Southern Ethiopia
Abortion	17 resp. IS and 20 resp. SI	94% Cbc (local x Friesian)	57.14	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Infertility	17 resp. IS and 20 resp. SI	94% Cbc (local x Friesian)	34.28	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Vaginitis	17 resp. IS and 20 resp. SI	94% Cbc (local x Friesian)	11.42	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Neonatal Death	17 resp. IS and 20 resp. SI	94% Cbc (local x Friesian)	8.57	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Stillbirth	17 resp. IS and 20 resp. SI	94% Cbc (local x Friesian)	6.4	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Metritis	17 resp. IS and	94% Cbc	5.71	[25]	Khartoum, Gazira,

	20 resp. SI	(local x Friesian)			Sinnar, and White Nile States of Sudan
Brucellosis	Extensive and intensive systems	Dairy cattle	33	[26]	In and around Asella town Oromia region, Central Ethiopia
Repeat breeding	Extensive and IS	Dairy cattle	27	[26]	In and around Asella town Oromia region, Central Ethiopia
RFM	IS and SI systems	Dairy cattle	3.1	[27]	In and around Ambo, central Oromia, Ethiopia
Abortion	IS and SI systems	Dairy cattle	2.8	[27]	In and around Ambo, central Oromia, Ethiopia
Dystocia	IS and SI systems	Dairy cattle	2.8	[27]	In and around Ambo, central Oromia, Ethiopia
Repeat breeding	91.2% IS	93.6 % Cbc (dairy cattle)	7.8QS	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
RFM	91.2% IS	93.6 % Cbc (dairy cattle)	6.2 QS	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Anestrus	91.2% IS	93.6 % Cbc (dairy cattle)	3.7 QS	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Dystocia	91.2% IS	93.6 % Cbc	3.3 QS	[28]	In and around Dessie town, South

		(dairy cattle)			Wollo zone, North Eastern Ethiopia
Vaginal prolapse	91.2% IS	93.6 % Cbc (dairy cattle)	2.9 QS	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Abortion	91.2% IS	93.6 % Cbc (dairy cattle)	2.1 QS	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Repeat breeding	91.2% IS	93.6 % Cbc (dairy cattle)	2.1 RFU	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Anestrus	91.2% IS	93.6 % Cbc (dairy cattle)	1.6 RFU	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
RFM	91.2% IS	93.6 % Cbc (dairy cattle)	1.4 RFU	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Dystocia	91.2% IS	93.6 % Cbc (dairy cattle)	1.2 RFU	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Abortion	91.2% IS	93.6 % Cbc (dairy cattle)	1.0 RFU	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
RFM	Intensive system	Dairy cattle (Cbc)	11.7 QS	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia

Abortion	Intensive system	Dairy cattle (Cbc)	8.3 QS	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Repeat breeding	Intensive system	Dairy cattle (Cbc)	8.04 QS	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Anestrus	Intensive system	Dairy cattle (Cbc)	4.1 QS	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Dystocia	Intensive system	Dairy cattle (Cbc)	4.1 QS	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Still birth	Intensive system	Dairy cattle (Cbc)	2.4 QS	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Repeat breeding	Intensive system	Dairy cattle (Cbc)	6.4 RFU	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Abortion	Intensive system	Dairy cattle (Cbc)	4.6 RFU	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
RFM	Intensive system	Dairy cattle (Cbc)	3.7 RFU	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Anestrus	Intensive system	Dairy cattle (Cbc)	1.8 RFU	[16]	Bishoftu town, east Showa zone of

					Oromia region, Ethiopia
Dystocia	Intensive system	Dairy cattle (Cbc)	0.9 RFU	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Dystocia	78.7% SI system	95.5% Cbc (Arsi × Jersey) or (Arsi × HF)	15.5	[29]	Asella town, central Ethiopia
Repeat breeder	78.7% SI system	95.5% Cbc (Arsi × Jersey) or (Arsi × HF)	8.1	[29]	Asella town, central Ethiopia
RFM	78.7% SI system	95.5% Cbc (Arsi × Jersey) or (Arsi × HF)	5.3	[29]	Asella town, central Ethiopia
Abortion	78.7% SI system	95.5% Cbc (Arsi × Jersey) or (Arsi × HF)	4.5	[29]	Asella town, central Ethiopia
Metritis	78.7% SI system	95.5% Cbc (Arsi × Jersey) or (Arsi × HF)	2.6	[29]	Asella town, central Ethiopia
Anestrous	78.7% SI system	95.5% Cbc (Arsi × Jersey) or (Arsi × HF)	2.3	[29]	Asella town, central Ethiopia
Repeat breeder	Unknown	Dairy cattle (Cbc)	32.76 RF	[30]	Shahjadpur Upazilla in Sirajgonj district of Bangladesh
Anoestrus	Unknown	Dairy cattle (Cbc)	20.69 RF	[30]	Shahjadpur Upazilla in Sirajgonj district of Bangladesh
Metritis	Unknown	Dairy cattle	8.62 RF	[30]	Shahjadpur

		(Cbc)			Upazilla in Sirajgonj district of Bangladesh
RFM	Unknown	Dairy cattle (Cbc)	6.9 RF	[30]	Shahjadpur Upazilla in Sirajgonj district of Bangladesh
Abortion	Unknown	Dairy cattle (Cbc)	5.17 RF	[30]	Shahjadpur Upazilla in Sirajgonj district of Bangladesh
Abortion	Intensive system	Dairy cattle	49.12	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
RFM	Intensive system	Dairy cattle	22.89	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
Stillbirth	Intensive system	Dairy cattle	16.13	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
Repeat breeding	Intensive system	Dairy cattle	17.86	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
Metritis/ Endometritis	Intensive system	Dairy cattle	10.11	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India

Acronyms in the table above: Cbc=Crossbred cattle, RFM=Retained Fetal Membrane, HFxZ=Holstein Friesian x Zebu, a= prevalence of major reproductive problems in Alage dairy farm from September 2016 to September 2017, b=prevalence of major reproductive problems in Alage dairy farm from November, 2017 to April, 2018, resp.=respondents, IS=Intensive System, SI=semi-intensive, QS=Questionnaire Survey information, RFU=Regular Follow Up information, RF=relative frequency information

Table 2. Ecological distributions of major cattle reproductive diseases and disorders

Reproductive diseases and problems	Agro-ecology		Author(s)	Remark
	Altitude (masl)	Zone		
Repeat breeding	1500-3000	64.7% Weina dega	[14]	Hosanna, SNNP, Ethiopia
Anestrous	1500-3000	64.7% Weina dega	[14]	Hosanna, SNNP, Ethiopia
Retained placenta	1500-3000	64.7% Weina dega	[14]	Hosanna, SNNP, Ethiopia
Anestrous	2000	<i>Weina dega</i>	[21]	In and around Mekelle, Ethiopia
Repeat breeding	2000	<i>Weina dega</i>	[21]	In and around Mekelle, Ethiopia
Dystocia	2000	<i>Weina dega</i>	[21]	In and around Mekelle, Ethiopia
RFM	1650	<i>Weina dega</i>	[22]	Bako Research Center, Ethiopia
Dystocia	1650	<i>Weina dega</i>	[22]	Bako Research Center, Ethiopia
Abortion	1650	<i>Weina dega</i>	[22]	Bako Research Center, Ethiopia
Stillbirths	1650	<i>Weina dega</i>	[22]	Bako Research Center, Ethiopia
RFM	2088	<i>Weina dega</i>	[23]	Nekemte town, East Wollega Zone, Ethiopia
Abortion	2088	<i>Weina dega</i>	[23]	Nekemte town, East Wollega Zone, Ethiopia
Dystocia	2088	<i>Weina dega</i>	[23]	Nekemte town, East Wollega Zone, Ethiopia
Anestrus	30-2000	<i>Berha, Kola and Weina dega</i>	[17]	Meghalaya province of North-Eastern India
Repeat breeding	30-2000	<i>Berha, Kola and Weina dega</i>	[17]	Meghalaya province of North-Eastern India
RFM	30-2000	<i>Berha, Kola and Weina dega</i>	[17]	Meghalaya province of North-Eastern India

Abortion	30-2000	<i>Berha, Kola and Weina dega</i>	[17]	Meghalaya province of North-Eastern India
Repeat breeder	1600	<i>Weina dega</i>	[18]	Alagae dairy farm, Southern Ethiopia
RFM	1600	<i>Weina dega</i>	[18]	Alagae dairy farm, Southern Ethiopia
Abortion	1600	<i>Weina dega</i>	[18]	Alagae dairy farm, Southern Ethiopia
Dystocia	1600	<i>Weina dega</i>	[18]	Alagae dairy farm, Southern Ethiopia
Anoestrus	1600	<i>Weina dega</i>	[18]	Alagae dairy farm, Southern Ethiopia
Abortion	Unknown	Semi-desert (north) and savannah (South)	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Infertility	Unknown	Semi-desert (north) and savannah (South)	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Vaginitis	Unknown	Semi-desert (north) and savannah (South)	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Neonatal Death	Unknown	Semi-desert (north) and savannah (South)	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Stillbirth	Unknown	Semi-desert (north) and savannah (South)	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Metritis	Unknown	Semi-desert (north) and savannah (South)	[25]	Khartoum, Gazira, Sinnar, and White Nile States of Sudan
Brucellosis	2430	<i>Dega</i>	[26]	In and around Asella town Oromia region, Central Ethiopia
Repeat breeding	2430	<i>Dega</i>	[26]	In and around Asella town Oromia region, Central Ethiopia

RFM	1380-3030	<i>Kola, Weina dega and Dega</i>	[27]	In and around Ambo, central Oromia, Ethiopia
Abortion	1380-3030	<i>Kola, Weina dega and Dega</i>	[27]	In and around Ambo, central Oromia, Ethiopia
Dystocia	1380-3030	<i>Kola, Weina dega and Dega</i>	[27]	In and around Ambo, central Oromia, Ethiopia
Repeat breeding	2400-2800	<i>Dega</i>	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
RFM	2400-2800	<i>Dega</i>	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Anestrus	2400-2800	<i>Dega</i>	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Dystocia	2400-2800	<i>Dega</i>	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Vaginal prolapse	2400-2800	<i>Dega</i>	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
Abortion	2400-2800	<i>Dega</i>	[28]	In and around Dessie town, South Wollo zone, North Eastern Ethiopia
RFM	1850	<i>Weina dega</i>	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Abortion	1850	<i>Weina dega</i>	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Repeat breeding	1850	<i>Weina dega</i>	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Anestrus	1850	<i>Weina dega</i>	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Dystocia	1850	<i>Weina dega</i>	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Still birth	1850	<i>Weina dega</i>	[16]	Bishoftu town, east Showa zone of Oromia region, Ethiopia
Dystocia	2,400	<i>Dega</i>	[29]	Asella town, central Ethiopia
Repeat breeder	2,400	<i>Dega</i>	[29]	Asella town, central Ethiopia

RFM	2,400	<i>Dega</i>	[29]	Asella town, central Ethiopia
Abortion	2,400	<i>Dega</i>	[29]	Asella town, central Ethiopia
Metritis	2,400	<i>Dega</i>	[29]	Asella town, central Ethiopia
Anestrous	2,400	<i>Dega</i>	[29]	Asella town, central Ethiopia
Abortion	Unknown	Unknown	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
RFM	Unknown	Unknown	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
Stillbirth	Unknown	Unknown	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
Repeat breeding	Unknown	Unknown	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India
Metritis/ Endometritis	Unknown	Unknown	[31]	Ahmedabad, Anand, Surat, Navsari, Valsad and Vapi of Gujarat, India

masl= meter above sea level

3.1. Effect of major cattle reproductive diseases and disorders on cattle reproduction and production

The major reasons for decreased reproductive efficiency and of lifetime productivity are reproductive disorders [32]. A study on reproductive loss revealed that low reproductive efficiency hinders genetic improvement in dairy cow and cause direct economic loss [33]. The major reproductive health problems occurred in urban and per urban areas of Hosanna of SNNP Region, Ethiopia which comprised repeat breeder, anestrous, retained placenta, and dystocia were the major causes of low reproductive performance of dairy farms in the area [14]. Moreover, prolonged anoestrus, abortion, still birth and RFM were found to be some of the reproductive disorders mostly affecting the reproductive performances of Jersey breed dairy cattle maintained at Adea berga dairy farm [24]. [25] reported on abortion at different stages of gestation in Sudan that abortion is a serious problem (76.25%) at the third trimester of gestation than in the first and second trimesters. Moreover, [26] also revealed that abortion is a serious problem (45.1%) at the third trimester of gestation. [25] also indicated that the incidence of reproductive disorders was more frequent in intensively managed dairy farms as compared to semi-intensively managed dairy farms. Brucellosis is highly characterized primarily by causing abortion in late pregnancy [34]. Abortions in female cattle and infertility in male cattle that are infected and discharge bacteria in their semen is due to Bovine brucellosis caused by *Brucella abortus* [35,36].

4. Conclusions and Recommendations

Reproductive diseases and disorders are the major reasons for decreased reproductive efficiency in dairy cattle. The prevalence of the reproductive diseases and disorders indicates that they are major threats to fertility, reproductive

efficiency and overall productivity of dairy cattle. Brucellosis is an infectious reproductive and zoonotic global disease, and causes heavy economic losses and public health concern. It is not the treatment of reproductive disorders but the prevention of reproductive disorders that prevent economic losses. There is a considerable economic loss due to the major reproductive diseases and disorders in small scale and large scale dairy cattle farms. The major exhibitions and finger prints of the reproductive diseases and disorders include reduced reproductive rate, prolonged postpartum anestrus and calving interval, conception failure and increased services per conception, increased cost of medication, and overall reduced lifetime calf crop and milk production.

An in-depth study of the reproductive diseases and disorders should be carried out across the different agro-ecologies, seasons of the year and specific cattle genotypes.

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Authors have declared no competing interests.

Consent for Publication

The authors declare that they consented to the publication of this review. The review has been submitted for publication with due consent of authorities of their institute.

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Ethical statement and Conflict of interest

The review presented here does not involve any experiment with human or animals. The review has been carried out solely by authors reviewing the available published reading materials so there is no conflict of interest in publication of this review.

Authors' Contributions

Both the authors took part in literature review, and manuscript writing equally.

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